

SCO M3: Solve problems, using SI and imperial units, that involve linear measurement using estimation and measurement strategies.  
[ME, PS, V, C]

#### ACHIEVEMENT INDICATORS

- Provide referents for linear measurements, including millimetre, centimetre, metre, kilometre, inch, foot, yard and mile, and explain the choices.
- Compare SI and imperial units, using referents.
- Estimate a linear measure, using a referent, and explain the process used.
- Justify the choice of units used for determining a measurement in a problem-solving context.
- Solve problems that involve linear measure, using instruments such as rulers, callipers or tape measures.
- Describe and explain a personal strategy used to determine a linear measurement such as circumference of a bottle, length of a curve, or perimeter of the base of an irregular 3-D object.
- Solve a problem that involves the conversion of units within or between SI and imperial systems.
- Verify, using unit analysis, a conversion within or between SI and imperial systems, and explain the conversion.
- Justify, using mental mathematics, the reasonableness of a solution to a conversion problem.

#### Useful Referents for Common Metric Measurements

##### Linear Measurement

A **referent** is an object that represents approximately one unit of measurement.

- Centimeter: the width across a child's little finger at the first joint, or the width of a standard paper clip
- Millimeter: the thickness of a dime, or the diameter of the wire on a standard paperclip
- Meter: height of a door knob from the floor
- Kilometer: distance you could walk comfortably in 15 minutes; or six-tenths of a mile

One Km:  
From OHS to  
the mall

##### Mass

- Gram: a regular jelly bean, a standard paper clip
- Milligram: one thousandth of a regular jelly bean
- Kilogram: two footballs, a little more than 2 pounds (2.2 pounds)

##### Volume

- Milliliter: the liquid you could fit in a regular-sized jelly bean or in a base-10 unit cube
- Liter: a "1-liter" bottle, a little more than a quart (1.06 quarts)

## Useful Referents for Common Imperial Measurements

### One inch:

A standard way to measure one inch is to use the second knuckle of your index finger

### One foot:

- A men's size 14 shoe is exactly one foot long.
- There is the \$5 foot long sub at Subway.
- And, it is often 1 foot from elbow to wrist

### One mile:

-A mile would be from OHS to the main entrance of CFB Movie theaters. (turning right at the lights at Ridgeview School)

### One yard:

- there are 3 feet in one yard
- a little less than one meter

## How to convert between SI units and Imperial units:

### The Conversion Factors Between SI and Imperial Units

#### SI to Imperial

1 mm = 0.0394 in

1 cm = 0.3937 in

1 m = 3.2808 ft

1 m = 1.0936 yd

1 km = 0.6214 mi

#### Imperial to SI

1 in = 25.4 mm

1 inch = 2.54 cm

1 ft = 0.3048 m

1 yd = 0.9144 m

1 mi = 1.6093 km

### Conversion b/w SI and Imperial

1 kg = 2.2 lb

454 g = 1 lb

2000 lb = 1 ton (imperial)

2200 lb = 1 tonne = 1000 kg (metric)

#### Example 1:

40 m = \_\_\_\_\_ in

$$40 \cancel{\text{m}} \times \frac{100 \cancel{\text{cm}}}{1 \cancel{\text{m}}} \times \frac{0.3937 \text{ in.}}{1 \cancel{\text{cm}}} = 1574.8 \text{ in}$$

#### Example 2:

2 km = \_\_\_\_\_ in

$$2 \cancel{\text{km}} \times \frac{100000 \cancel{\text{cm}}}{1 \cancel{\text{km}}} \times \frac{0.3937 \text{ in.}}{1 \cancel{\text{cm}}} = 78740 \text{ in}$$

#### Example 3:

15) 12 yd = \_\_\_\_\_ cm

## Thursday, April 26

There will be no extra help at lunch hour Thursday and Friday of this week only.

- Check and go over homework (any 6 from worksheet)
- Review some conversion word problems
- Classwork/Homework

**Please come up and show me your completed homework questions!**

### Practice:

1) 26 cm = \_\_\_\_\_ in

2) 4.8 ft = \_\_\_\_\_ m

3) 7.9 in = \_\_\_\_\_ mm

4) 42 km \_\_\_\_\_ mi

5) 12 m \_\_\_\_\_ ft

6) 832 mi \_\_\_\_\_ km

7) 15.5 mm = \_\_\_\_\_ in

8) 4.5 yd = \_\_\_\_\_ m

9) 28 ft = \_\_\_\_\_ cm

10) 32 km = \_\_\_\_\_ ft

11) 58 in = \_\_\_\_\_ m

12) 4 mi = \_\_\_\_\_ m

Covert the following:

1) 16 in = 40.64 cm

2) 6 km = 3.73 mi

3) 1.2 m = 3.94 ft

4) 37 cm = 14.6 in

5) 250 mm = 9.85 in

6) 17 ft = 5.18 m

7) 42 mi = 67.6 km

8) 12 yd = 10.98 m

9) 23 in = 584.2 mm

10) 6.75 km = 4.2 mi

11) 4 yd = 365.76 cm

12) 125 cm = 4.1 ft

13) 850 m = 0.53 mi

14) 5 mi = 8046.5 m

15) 16 ft = 4876.8 mm

$$125 \text{ cm} \times \frac{0.3937 \text{ in}}{1 \text{ cm}} \times \frac{1 \text{ ft}}{12 \text{ in}}$$

$$=$$

Everyone please try this question NOW :)

Giselle would like to replace the carpet in her living room. She used her imperial tape measure to measure the room, and the dimensions were 12 ft by 15 ft. When she went to the carpet store, she found the price of the carpet was \$24.99/m<sup>2</sup> (taxes included). She cannot order less than a full square metre of carpet.

a) How much carpet should she order?

$$3.66 \times 4.57$$

$$= 16.73 \text{ m}^2$$

$$= 17 \text{ m}^2$$

$$12 \text{ ft} \times \frac{0.3048}{1 \text{ ft}} = 3.66 \text{ m}$$

$$15 \text{ ft} \times \frac{0.3048}{1 \text{ ft}} = 4.57 \text{ m}$$

b) How much will the carpet cost?

$$17 \text{ m}^2 \times \$24.99/\text{m}^2$$

$$= \$424.83$$

### Example 2

Samir is the cost estimator for a landscape company. He has to calculate the amount of material needed to construct a circular outdoor patio built from paving stones. The diameter of the patio is 13 m. One bundle of paving stones covers  $116 \text{ ft}^2$ . Samir has ordered 11 bundles of paving stones. Did he order enough paving stones?

## Classwork/Homework

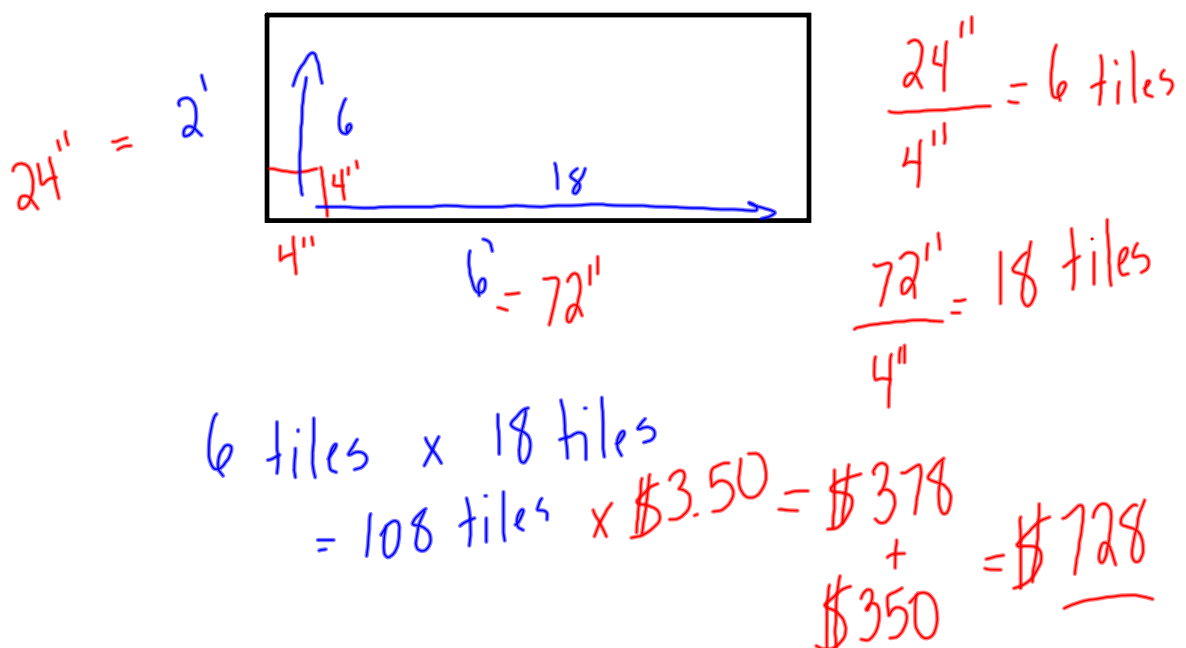
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1. A low bridge has a posted maximum vehicle height of 7'6". Your truck is 2.3 m high. Will it fit under the bridge?

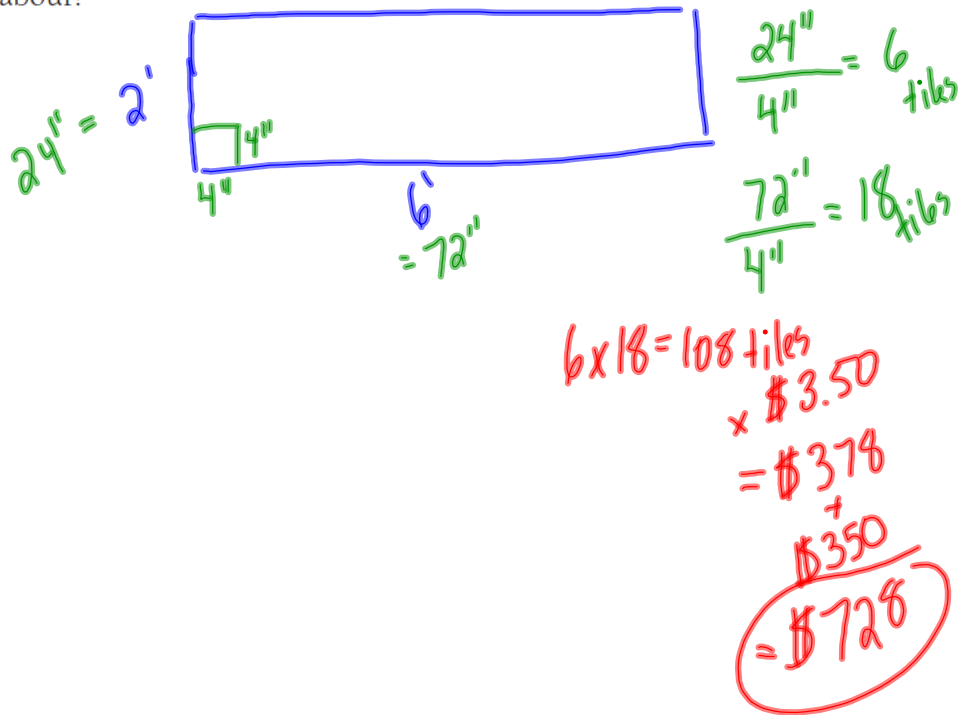
2. A wooden dowel is 0.75 m long. What is its length in centimetres? In inches? You need to record the length of the dowel on a sketch for a carpentry project. Which unit of measurement will you choose to label the sketch with, and why?

3. Valerie wants to apply for a driver's licence. The application asks her to state her height in cm. Valerie is 5'8" tall. What is her height in cm?

Sandy has been asked to give an estimate for replacing a countertop in a client's kitchen. The countertop measures 2' x 6' and the client wants Sandy to install 4" x 4" tiles that cost \$3.50 each. Sandy has estimated her labour charge will be \$350.00. What is the total cost of tiles and labour?



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5. Moncton Recreation, Parks and Culture wants to install grass sod on a playground that measures 20 m x 40 m. Two companies have bid on the job. Company A's bid was \$4.00/yd<sup>2</sup> installed. Company B put in a bid of \$2.50/m<sup>2</sup> plus \$2000.00 for installation. Which company should get the job based on the best price?



6. The materials for a project Justine is making call for 5 ft of twine. The store she visits to buy materials only has a metre stick marked in centimetres and millimetres for measuring. Justine thinks she needs 150 cm of twine. Is Justine's answer correct? Explain how you know.
7. Shelley is trying to decide whether to put hardwood flooring or carpet on her living room floor. The dimensions of the room are 22 ft by 16 ft. The hardwood flooring costs \$18.99/m<sup>2</sup> with an installation cost of \$1500.00. The carpet costs \$21.95/yd<sup>2</sup> with an installation cost of \$1350.00. Which type of flooring costs less?

## BUILD YOUR SKILLS

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